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Photo by John D. Wright

Coryphantha besteri, sp. nov.

(See page 274)

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Coryphantha hesteri, sp. nov.

By YSABEL WRIGHT

CORYPHANTHA HESTERI sp. nov. Ysabel Wright 1932. *Simplex* vel *caespitosa*, vertice subdepressa glabra aculeisque superata; *mamillae* ad 5 et 8 series ordinatae conicae sulcatae glandulisque deficientibus; *axillis* nudis; *areolae* orbiculares lanuginosae mox glabrescentes; *aculei* radiales 16-22 vitreoalbi rigidi 7-15 mm. longi superioribus longioribus fasciculatimque dispositis, centrales nulli. *Flores* parvi ovario viridescente segmentis exterioribus longe ciliatis, interioribus lanceolatis vel lineari-oblongis pallide purpureis; stylus flavido-roseus stigmatibus lobis 4 gilvis. Fructus atque semen mihi ignoti.

Brewster County, Texas, J. P. Hester 1930.

Species inter *Coryphantham arizonicam* et *Coryphantham deserti* inserenda est, seriei *Sulcolanatae*.

Description:

Plant globose, 2.5-4 cm. high. Single or caespitose, forming clumps to 30 cm. in diameter. Young growth light green, when mature darker green to crusty gray. Apex subdepressed, naked, closed by the half-erect youngest spines. *Axil* of tubercles naked. *Tubercles* spirally arranged in 5 or 8 rows, conic, 7-12 mm. long, to 5 mm. in diameter. The groove along upper side of each tubercle extends from below areole to 1 or 2 mm. above axil of tubercle, naked, only on youngest tubercle a little tuft of white wool develops at base of groove. *Areoles* circular, 2-4 mm. in diameter, slightly white-felted, soon naked. *Spines* all radial, stiff, glassy white, youngest ones with slightly darkened, as if burnt, tips, 7-15 mm. long, upper ones longest. 14-16 spines are evenly spread, in addition a small bundle of 4-6 slightly weaker ones of the

same color and length is formed at upper part of areole.

Flowers appear out of youngest axils of mature plants during May-June, lasting for 2 days in hot sun. Flower light purple, 2.3 cm. long, opens rotate-campanulate to 2.5 cm. wide. *Ovary* 4 mm. long, 4 mm. in diameter, bulbous, green to palest green at the base, tube 6 mm. long, widening to 7 mm. at upper end, greenish with 3 small finely ciliated scales. *Outer perianth-segments* lanceolate, long-ciliate, green. The larger upper ones are purplish-brown with lighter-colored, shortly ciliate margins. The 24 to 27 *inner perianth-segments* are slender-oblong to linear, 1 cm. long, 2 mm. wide, narrowing to 0.75 mm. at base, light purple; innermost segments of same color, slightly shorter and narrower. *Filaments* glassy white, 5 mm. long, attached on inside of tube, very sensitive; *anthers* bright chrome-yellow. *Style* slender, 13 mm. long, exserted beyond filaments, yellowish with faded pink tip, bearing 4 stout cream-colored *stigma-lobes* 1 mm. long.

Fruit and seed as yet unknown.

Type-locality: Near Mt. Ord, about 10 miles southeast of Alpine, Brewster County, Texas.

Distribution: Brewster County, Texas.

Discovered in 1930 by J. P. Hester.

The plant belongs in series *Sulcolanatae*, between *C. arizonica* and *C. deserti*.

Figs. CACTUS JOURNAL III, 84 (November 1931) and p. 273 [this issue].

The Stapelieae

14. Pectinaria

By N. E. BROWN

This genus is perhaps the most unattractive as well as one of the most interesting in the tribe of the STAPELIEAE. It is unattractive because its flowers are small and dull colored outside, for the lobes of the corolla, instead of spreading, are closed altogether and united at the tips, leaving only narrow openings between them, through which only very minute insects can have access to the interior of the flower, which is not exposed to view. This lends it an interest, as evidently it must be fertilized by a different group of insects from the other allied genera. It is further interesting because of the singular underground habits of two of its species. Several of the STAPELIEAE throw out underground stems, reappearing at the surface at some distance from the parent plant; but the "Hoop-like Pectinaria", *P. arcuata* N. E. Br., in a way reverses this process as it invariably finishes the growth of its aerial shoots underground, sometimes, it is true, rising again to the surface, but always making a final underground dive with the very tip of its growth. Another singular habit occurs in *P. pillansii* N. E. Br., in which the mature flowers are all developed underground, the young flower-buds which are formed above ground not developing. This is quite unique in the whole of the Order ASCLEPIADACEAE.

In connection with this genus a remarkable coincidence befell the writer, for one afternoon when preparing my account of the ASCLEPIADACEAE for the Flora Capensis I had arrived at the genus *Pectinaria* and was somewhat puzzled about it, for I did not quite understand the structure of the flower as given by Haworth in 1819 in his "Supplementum Plantarum Succulentarum", p. 14, which account, together with Masson's figure of the plant ("Stapelieae Novae", p. 20, t. 30, see Fig. 81), in which no details of structure are represented, was all that was known of the plant, as no material of it had been preserved. I had just decided merely to give a translation of Haworth's description of this solitary species which he knew and called *P. articulata* Haw., when a letter and parcel were brought to me. Upon opening the parcel my astonishment and delight can well be imagined when I found it to contain not only what must be either a variety of the very species

Haworth had described or a species very close to it, but also four other new species of the same genus, preserved in spirit and each accompanied by a piece of the living plant! They had been sent me by N. S. Pillans, the great collector at the Cape, who had even surpassed himself by discovering these five very rare species at points in the Cape Colony very remote from one another, some in the East and some in the West regions, and others along the coast region. In the case of the species which I named after him, *P. pillansii*, only one plant was ever found, under the dry leaves of an aloe.

This amazing invoice was a most welcome coincidence that enabled me to give a much more complete account of the genus than had previously appeared. But my astonishment was not to end here, for upon dissecting a flower of one of the new species (*P. asperiflora* N. E. Br.), I was amazed to find that the inner surface of the corolla lobes was totally different in structure from any lobes or petals seen in any of the many thousands of flowers of all orders I had previously examined and appeared to be very charming, although from being preserved in fluid the color had faded.

As I was exceedingly interested in these plants I took great pains to get the cuttings sent me to grow, but all failed to root and establish themselves except *P. asperiflora*, which soon flowered. Now, both the plant and the flower in external appearance are about as unattractive as can well be imagined. The plant does not rise more than one and a half inches above the soil and consists of a cluster of leafless fleshy stems, in shape like little six to eight ribbed sausages, from three-quarters of an inch to three inches long and half to three-quarters of an inch thick, of a dingy purplish or green color. As stated, there are no leaves, but small tubercles bearing very minute points, which are the rudiments of leaves, are scattered along the stems, forming the ribs. During the late summer and autumn the plant bears at the tips of these stems small, nodding, subglobose flowers of about the size of a pea, on very short stalks.

The flower, as in all species of *Pectinaria*, is remarkable for the fact that the five lobes of the corolla are united at their tips, forming a cage-like top to the flower, the inside of which

cannot be seen. But *P. asperiflora* differs completely from the other *Pectinarias* once one pries the little cage open and looks inside. Indeed, when I first examined the flower I was so utterly astonished at what I saw that I could not help exclaiming: "Oh, my!" for I had never seen anything at all like it before. Externally the flower is utterly unattractive, but let anyone carefully cut a flower open and spread it cut without pressure and then examine it under a microscope with a one-inch objective and I am sure they will be as astonished as I was at the extraordinary structure and beauty of the inner surface of the corolla, which is covered with short columnar processes, not hairs but rather papillae, that are in turn thickly covered with short spikes, reminding one of the spiked clubs of Gog and Magog (Fig. 82:1), a surface utterly unlike that of any other flower known to me. On account of this rough inner surface of the flower I named the plant the "rough-flowered *Pectinaria*", *P. asperiflora*.

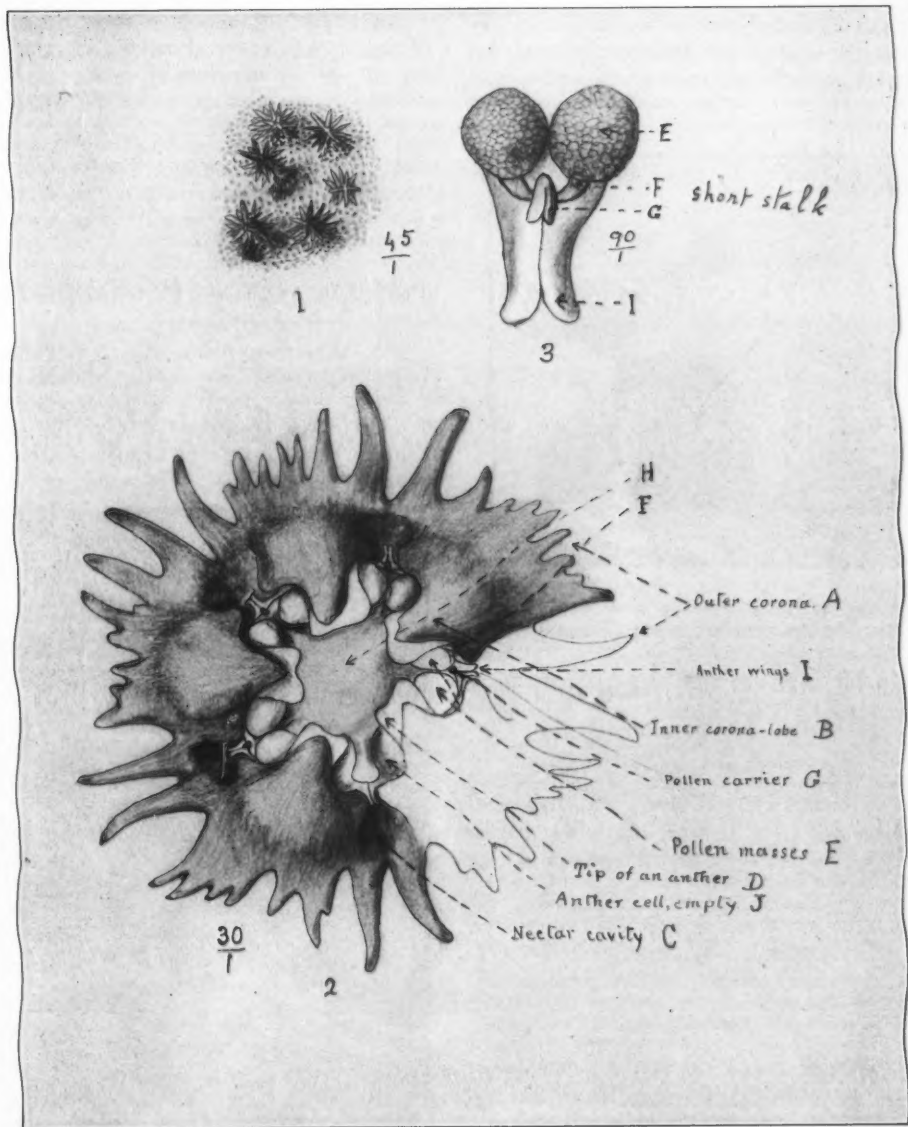
Apart from its remarkable structure the inner surface of the flower of this *Pectinaria* is marvelously beautiful in color when alive. The ground color is pure white, glittering and glistening as if covered with hoar-frost and richly marked with crimson spots, which produce an effect that once seen is not likely to be soon forgotten. But alas! as is the case with most flowers, its beauty cannot be preserved in its entirety. I have mounted one of the flowers as a slide for my microscope, and I treasure it in my "Goodness Gracious" box, along with several others of my own mounting, the like of which cannot be bought and of which of course I am as vain as a peacock, and like to show to my visitors. This flower I have mounted has an outline when spread out something like a bat's wing, and it is such an ugly looking, dingy blackish object that no one would imagine it to have been of the color I have described. Yet under the microscope the unique structure can still well be seen, the white color is there, but has lost all its sparkling frosted appearance, and the rich crimson has changed to a dark and dingy color somewhat like that of clotted blood. Nevertheless, it is still a very beautiful object, causing one to wonder what all this beauty and extraordinary surface structure, unlike any other in the Floral World, is for, and why it should be hidden from sight. Certainly it is not to delight the eye of man, beast, bird or insect, except such of the latter as are so small as to be able to crawl inside the flower through the chinks between the lobes, and even then the interior is so dimly lighted, from the openings being di-

rected towards the ground, that little of its beauty could be seen. It is usually supposed that any peculiar structure in a flower has some relation to the mode of fertilization, but I hardly believe this can be the case with this plant, as other species of the genus have flowers that are just the same in general details and must be fertilized in the same manner, perhaps even by the same insects, but they lack the peculiar inner surface structure of the corolla, for although two or three other species have a frosted and slightly rough inner surface, yet it is quite different from that of *P. asperiflora*.

But if the microscope reveals mysteries, it often also reveals explanations, and the drawing of the corona of this same *P. asperiflora*, magnified thirty diameters in Fig. 82:2, may help readers to understand the mechanism of pollenization throughout the STAPELIEAE, which was outlined by Messrs. White and Sloane in the first chapter of this series.

The whole corona of *P. asperiflora* is of a very dark purple-brown or blackish color. The outer corona (A) is toothed all around the margin, whence Haworth derived the generic name *Pectinaria* (from *pecten*, a comb); from its inner side project the five deltoid or tongue-like lobes of the inner corona (B). In the pocket-like spaces (C) between these lobes a slight amount of nectar is secreted to attract insects. The inner corona lobes (B) rest closely upon the backs of the whitish anthers (D), which they partly conceal. The pollen-grains in each anther-cell are not loose as in most plants, but are united into a globose, yellowish, waxy mass, just as they are in orchids, and are exposed to view (E). These pollen-masses are attached in pairs by very short stalks (F) to a pollen-carrier (G). There are five pollen-carriers and to each of them the pollen-mass attached to its right-hand side belongs to one anther and that on the left-hand side belongs to a different but adjacent anther.

The pollen-carrier (G) is better seen in Fig. 82:3. It is a very remarkable structure, which does not occur in any other order of plants, although it has an equivalent in the Order of the ORCHIDACEAE in the gland to which the pollen-masses are attached. In *Pectinaria* and all other Asclepiads the pollen-carrier and the stalks of the pollen-masses are not formed of cells, as are all the other parts of the flower, but of a more or less horny secretion exuded by the tissue on which they rest. Each pollen-carrier is hollow, open at the lower end, closed at the top, and slit down the outer side; the edges of the slit meet closely except at the lower end,



Drawing by N. E. Brown.

FIG. 82. *Pectinaria asperiflora*. 1. Spiked processes on papillae of corolla. 2. Corona. 3. Pollen-masses.

where they gape, see Fig. 82:3 at (G).

The central part (H) is the top of the style, not the stigma, and is white in color. The stigmas are five in number and absolutely concealed from view, being cavities in the interior of the style-top, the only access to them being by means of a minute opening under the struc-

ture (I), which latter is of the utmost importance to the flower, because it is only by means of it that fertilization can be effected. It is formed in this way: From the base of each anther or from each filament immediately below the anther a wing-like growth extends on each side, directed slightly outwards half across the

interval between two anthers or stamens, so that the edge of one anther-wing meets, but is not united to the edge of the anther-wing of an adjacent anther, except at the lowest point, where they gape and form a small wedge-



Photo by Havens

FIG. 83. *Pectinaria saxatilis* x. 75

Flower on the right was broken open accidentally.

shaped opening. This opening and cleft is vertically under the cleft in the pollen-carrier, and behind it is the stigmatic cavity.

Now for the action of all this complex structure. The minute creature that enters one of these flowers does so primarily to sip the nectar in the cavities (C). In doing this it is almost certain that a leg, antenna, hair or the tongue will get inserted in the gaping basal part of (I) and caught by the meeting edges of that structure, which are elastic and act like springs. As the insect tries to withdraw its captured member it pulls it higher and higher up the cleft of (I) until it enters the very similar gape of the cleft in the pollen-carrier, see Fig. 82:3 (G), where it is again entrapped and held fast by the elastic edges of the cleft in this structure, which, being loosely attached, is pulled away, with the pollen-masses attached to it, leaving the anther-cells empty (J).

The insect upon visiting another flower carries the pollen-masses with it, and one or occasionally both of them may enter the gaping opening of (I) when the same process occurs I have just described, but the pollen-mass is too large to be pulled out of the cleft, so when the stalk reaches the top and is about to pass into the cleft of the pollen-carrier, it breaks from the stalk and is left behind in the stigmatic cavity, where it soon produces a bundle

of pollen-tubes and thus effects fertilization.

I trust from all I have written that something of the wonders of the genus *Pectinaria* may be understood, and especially something of the unique beauty of the flower and highly developed complexity of the corona of this favorite species of mine, *P. asperflora*. Beneath its unattractive and dingy purple exterior lie secrets which may well evoke in us all in turn amazement, study and thought.

PERESKIA AS STOCK IN GRAFTING

By R. KATAGIRI, *Proprietor*

Kyorakuen Nursery Co., Yokohama.

Amateur, likewise trader, often find difficulty in finding suitable stock in grafting, causing great loss, while he may save his dwindling favorite if only he could find handy, suitable, healthy stock to graft it. It is widely known



Photo from Author

A graft from our friends in Japan.

Cereus family, is good stock to graft to, on which scion grows nicely and heavily, but, you do not want to sacrifice your nice *Cereus* to save another plant. Sometimes it is too big to be utilized for such purpose or too small.

Pereskia family, too, is known to be good stock, but most of them have such small trunk

to be utilized for this purpose and generally require skill to obtain satisfactory result, although you can have them ready in stock—any quantity of them, being cheap and easy grower. However, it is not so difficult nor so troublesome.

You see in the photo 2 grafts on *Pereskia bleo*, most commonest cactus amongst collector. The top graft is about 4 months old and the scion was not much bigger than the lower, which is just grafted. The process is easiest of all grafting, as it does not require more than to

sharpen the trunk of *bleo*, as you sharpen your pencil, and insert into the scion. Essential point of this operation is the care to do it quick enough, not allowing time to cause calus where sharpened stock, and if you follow the method necessary in grafting, in general, as to use of clean knife, clear day when perform, etc., will be quite sufficient to success.

At least, this method of grafting will enable you to create fancy bowl of cactus with least expense and trouble.

Some Interesting Cereus Problems

Cereus lanatus, *sericatus*, *melanostele*, *pseudomelanostele*, *versicolor*, *multangularis*

By Curt Backeberg

Translated from the German by JAMES WEST.

Translator's Note: We have thought it best not to make any generic changes in the body of the article, to avoid confusion. Mr. Backeberg, like most German botanists, uses *Cereus* in the old inclusive sense, treating the Rosean genera as subgenera. With most of the species mentioned it will quite readily be apparent from the article itself, under which of the new genera to place them, i.e.: *Epostoa lanata* and *sericata*; *Binghamia pseudomelanostele*, *chosicensis* and *versicolor*; *Borziacactus aurivillus* and *plagiostoma*. As to *Cereus melanostele*, it would seem as though the author considered it to belong to the genus *Cephalocereus*, although he does not definitely so place it.

The Cereanæ mentioned in the sub-title are among the finest things we know in this tribe of cacti. But on account of the remoteness of Peru and of the confusion, in more than one respect, which had, for one reason or another, come to exist, it was until quite recently not possible to clear up these species. When it comes to the final revision of these CEREANÆ some remarkable facts should therefore come to light.

To begin with, once more the *lanatus*-problem:

Of the subgenus *Epostoa* I had at first distinguished the following species: *C. lanatus* (Southern Ecuador), *C. humboldtianus*, *C. sericatus* (Northern Peru), *C. dautwitzii*.

Having observed that height, seed, fruit and cephalium varied, I separated the species as above, i.e. I segregated the central Peruvian species as *C. dautwitzii*, because I assumed that, being the species most easily accessible, it would be the one that had recently found its way to Europe. Compared with the others, it remains small, and it is the only one with glossy seeds.

At the same time I found that I could not locate Dr. Vaupels *C. melanostele*. I made enquiries about it to Prof. Weberbauer of Lima, and no sooner did I receive his description of this *Cereus* than I recognized that *this* must be the "*Dautwitzii*"—except that the color of the wool had mistakenly been described as dark, because of the action of the alcohol on the prepared material. This species had therefore already been described by Vaupel, with only a slight error in regard to the color of the wool.

Now Dr. Werdermann, with whom I worked up my material, found that Humboldt's description fits, as a matter of fact, specifically the rather long-spined form of the true *lanatus* from the North, the plant with the beautiful red radials. We have therefore merged this form (at first described as *C. humboldtianus*) with the other long-spined forms under the name of *C. lanatus*. In Dr. Werdermann's opinion *C. sericatus* is a subspecies, but, considering the extraordinary difference of the two forms at present going under the names of *C. lanatus* and *C. sericatus*, my own inclination is to consider them as good species, in spite of the fact that I cannot make any definite statements as to their flowers and fruit, for the *Indios* got my seeds all mixed. Later on, however, I made sure of a difference in the size of the seeds. In any case there exist all kinds of transition-forms between these two superficially very distinct species.

When I had opportunity later on thoroughly to inspect living material of *C. haagei* and *C. dautwitzii*, I inclined more and more to the conclusion that they must be specimens of the

northern Peruvian *Espostoa* which in some way had found their way across to Europe.

There is a var. *inermis* of the central Peruvian *Cereus* formerly called *C. dautwizii* by me, which as a seedling looks very much like *C. haagei*. But as these two names were never formally described, the material moreover being doubtful, it was logically concluded to keep Vaupel's old name *C. melanostele* for this species, only changing the description of the color of the wool to "white".

So we distinguish to-day:

Cereus lanatus

the species from southern Ecuador (?) and the long-spined forms of northern Peru;

C. sericatus

the silkily-gleaming kind, densely "over-spun" with spines, from northern Peru, without conspicuous long centrals;

C. melanostele,

from Central Peru; this has long centrals, golden yellow to black, and occurs also in variations without the long spines.

An interesting fact about these species is that the central Peruvian species, *C. melanostele*, is quite obviously a true *Cephalocereus*, as its cephalium appears, often repeatedly, on the areoles, while the cephalia of the northern Peruvian species originate from the central axis and grow in a channel.

But how about the Rosean name *C. (Binghamia) melanostele*? Like myself, Dr. Rose was most probably unable to find Vaupel's *C. melanostele* — for the color would not fit — and, having in the neighborhood of Cajamarca found another *Cereus* which also produced a few hairs, in addition had long spines, dense armament and about the same height, he most likely concluded that the old name applied to this species. The locality fitted, and it should certainly have been possible to find it there.

Through this error of Dr. Rose's it became necessary to change the name *Binghamia melanostele* (for this species is a *Binghamia*) to *Binghamia (Cereus) pseudomelanostele*.

C. pseudomelanostele

is therefore Rose's old *Binghamia melanostele*, with green flowers,

in addition to which I also found:

C. chosicensis,

with purple-red flowers.

We had furthermore also in our collections specimens of *C. multangularis*, which likewise was supposed to have come from Peru, there being indeed a var. *limensis* (i.e., from Lima),

also a var. *pallidior*. The finely-spined, highly-colored columns of this *Cereus* are very beautiful, and it is no wonder that it has been looked for again and again. Taking our departure from the fact that the name var. *limensis* must have had its origin in some kind of information denoting that locality as its habitat, we are practically limited to looking for it among the *Binghamia*-relationship, for these are the only *Cereanae* occurring there. The specimens in question may be forms of natural hybrids between *C. chosicensis* and *C. acanthus*, which are common there, and which might, in cultivation, easily have developed into forms similar to our present *C. multangularis*, considering the usual degeneration in the size of the spines, so well shown also in the case of *C. Straussii*.

However, I found in northern Peru columnar *Cerei*, thin, slender and quite colorful, which are even more similar to our cultivated forms of *C. multangularis*, but which do certainly not occur in the neighborhood of Lima. So *C.m. var. limensis* must be something else. I have tried to clear up this point. To begin with, the descriptions of *C. multangularis* are very defective; they would fit a *Binghamia* quite as well as my northern Peruvian *Cerei*, of which I brought home flowers, fruit and seed; so that we gave to this species the name of *C. versicolor*. This *Cereus* also has some very variable close relations which we have named accordingly.

In addition to these species there are two more, often resembling each other very much in the young growth: *C. aurivillus* and *C. plagiostoma*, which are perhaps the choicest of all. *C. aurivillus* produces bristly spines, softer and yellow, and at the flowering stage a shock of yellow bristles, while *C. plagiostoma* has coarser spines and produces only quite occasionally a few hairs from the areoles. However, height, diameter and habit (arcuate-erect), as well as flowers are approximately similar. The most important difference of *C. plagiostoma* is in its glowing green color, its foxy-red spines, coarse and stout when young, and the absence of long bristles. This, as well as *C. aurivillus* (the two seem occasionally to hybridize) are both splendid types, particularly when adorned with their numerous flaming flowers.

So we have in Peru among the generic divisions *Espostoa*, *Binghamia* and *Borzicactus* a few quite amusing problems; amusing because some of the plants have misled us into all sorts of errors, and altogether provide many interesting cases of close resemblance.

NOTE: The following 8 pages are the 15th installment from the Britton and Rose reprint of Vol. 1, The Cactaceae.

Notes on "The Cactaceae"

Edited by E. M. Baxter



Photograph by E. M. Baxter

Opuntia burrageana Br. & R. Photograph of a plant taken on the hillside 1 mile north of La Paz, Capital of Baja California del Sur. This plant is in full flower, but they are so small that it is difficult to distinguish any of them.

OPUNTIA BURRAGEANA

Opuntia burrageana is one of the rarer, yet widely distributed opuntias of lower Baja California. It seldom grows in colonies as do the other species, occasional plants being found in quite isolated spots.

The species may be found on both coasts between Cape San Lucas and La Paz. It does not grow in the higher territory on the Gulf coast, but is found there in low areas.

By the natives it is known as "Clavellina." The spines are much shorter than those of *Opuntia clavellina*, found to the north. It is easily distinguished both in the field and in cultivation by the golden yellow coloring of its spines and spine-sheaths.

Its flowers are green with a red mid-rib; giving the effect of a bronze to purple color from a short distance. They appear in a circle around the upper end of the branches, two to six in number.

As shown in the illustration, the plants branch from a very short trunk. Several main stalks will grow, not necessarily during the

same year. These are firmly attached to the trunk. Terminal and lateral branches are very easily broken off, and the strong barbs of the slender spines hold on so that only a touch against one is needed to dislodge it from the plant.

Opuntia burrageana is illustrated only by a small flowering joint in Plate XIV of "The Cactaceae." Its description was given on page 70 of Britton & Rose's Volume I, reprinted in Volume IV, No. 2 of the JOURNAL of the Cactus and Succulent Society, August, 1932.

The following species of *Opuntia* belongs to the *Clavatae Series*, being rather close to *Opuntia invicta* from which it differs in smaller size, more globular joints, and more compact manner of growth (due to the comparatively shorter joints).

The species was first shown in postcard illustrations by Haage, Jr., as *Opuntia moelleriana*.

We give herewith a translation of the original description and Mrs. Ysabel Wright's de-

scriptions of plant and flower from specimens in her gardens at Montecito.

Opuntia moellerii in ALWIN BERGER, 1929. p. 54

Much jointed plant, joints upright, 4 to 6 cm. long by 2 to 3 cm. diameter, green, with large long tubercles. Radials numerous, white, bristle-like, spreading. Upper ones in clusters upright, glochid-like. Centrals about 6, stronger bulbous at base, the 3 upper ones spreading upwards, lower ones spread downwards, longest one to 16 mm. long, flattened, whitish, slightly pubescent. Mexico—Coahuila. Berger does not give flower description.

Description by MRS. YSABEL WRIGHT

Low, much jointed plant; joints upright, somewhat clavate, 4 to 7 cm. long by 3 to 4 cm. in diameter, green; tubercles on joint to 2.5 cm. long, 1.5 cm. wide, to 1 cm. high. Areoles circular, to 4 mm. in diameter. Radial spines about 10, 6 to 12 mm. long, the upper shorter ones yellowish-brown, lower ones whitish, more or less appressed; numerous yellowish bristle-like glochids to 5 mm. long in upper part of areole. Central spines 4 to 6, lower ones somewhat appressed, dagger-like, to 2 cm. long to 1½ mm. wide, flat. Upper central spines somewhat stronger but a little shorter and darker colored. All centrals somewhat bulbous

cm. diameter at upper part, narrowing towards base, strongly tubercled, these to ¾ cm. long by 3 to 4 mm. high. Areoles circular, white felted, held by 1 leaf ½ to 1½ cm. long, yellowish pink. Also 5 to 15 white and light brown bristles in areole, these 1 to 7 mm. long. Sepals yellowish-brown, waxlike stiff, triangle shaped to 1 cm. wide as base. Petals 10 to 12, broadly oblong, somewhat lacerate, short-mucronate, 2½ cm. long by 1½ cm. wide; transparent yellow-greenish. Style yellowish-green, 2 cm. long, about 2 mm. diameter, a little paler and thinner towards base. Stigma lobes 7, stout, 3 to 4 mm. long; same color as style. Filaments green-yellowish to 1 cm. long. Outer ones curved over inner ones. Anthers yellow. Flowers appear in May and June, lasting for 1 day.

Sectional Division of the genus *Opuntia*—I

By E. M. BAXTER

For ease in practical use the present genus *Opuntia* could well afford to have its species grouped and classified in a manner different than that now in use. For quite some time material from studies that I have made have shown groupings that could be changed, and the thought was to erect new genera. However, discussion with botanists of note and readings of criticisms of this practice have made it seem wiser to group these species as Sections of the genus, leaving the possible future generic rating to some more qualified person.

Right now it must be said that a complete revision is not in prospect immediately, but that as specimens are studied and notes arranged certain groups will be placed in relation to other groups under a system that will ultimately include all of the genus.

Because the JOURNAL's reprinting of Britton & Rose's "The Cactaceae" is at the place now where this species should be placed, I want to present the idea and use the present genus *Grusonia* as the first of the Sections to be placed.

Grusonia as a genus was placed at the end of the *Opuntia* Tribe (*Opuntieae*) with no relationship to other genera mentioned. Alwin Berger in "die Entwicklungslinien der Kakteen, etc.," has shown the genus as being related to the subgenus *Cylindropuntia* of *Opuntia*.

The discovery of one new species and the realization that another plant classed with one of the clavate opuntias was in reality congeneric with *Grusonia bradleyana* have given us material which will definitely put *Grusonia* where it should be: Between *Cylindropuntia* (North American species) and the clavate opuntias of



Photo by John D. Wright
Opuntia moellerii flowering in Mrs. Wright's garden,
May, 1932.

at base. Leaves on strongly tubercled young joints are to 1 cm. long, stout, greenish-red.

Flower with ovary 5 to 6 cm. long. Opens to 5 cm. wide. Ovary green, 3 cm. long by 2

the Series *Clavatae*. According to the system used in the "Cactaceae" it should then be placed as a Series (12-A) with the generic name *Opuntia*; and with the now proposed name of *Grusonia*.

The Series (*Grusonia*) may be characterized as follows:

A branched, suberect cactus, the branches clavate at first, then cylindric: ribbed by confluence of long tubercles into ridges. Areoles borne at top of ribs in positions indicating upper end of tubercles: areoles bearing wool, some or no spine-like glochids, and large number of spines: spines glass-like, generally flattened, sometimes with rudimentary sheaths. Fruit compressed-globose, with spines and glochids in its areoles, deeply umbilicate.

I propose at this same time to make for it a Section in the genus *Opuntia* with the name of the former genus—*Grusonia*. The Section will be characterized the same as the Series.

The two new species await only the assembling and translation into Latin of their descriptions. The key to the species of the Section follows:

This Section's species suggest that they may be an older form which has given rise to our North American cylindric and clavate opuntias, combining as they do certain characteristics of both as well as of the *Cereus* Tribe (*Cereeae*).

Opuntia santa-maria is from Santa Maria Bay on Magdalena Island, Baja California; *Opuntia bradtiana* is from Coahuila, Mexico, and *Opuntia wrighbiana* from southwestern Arizona.

Their distribution would indicate that they are an old form, particularly because of the limited locality in which each now occurs. It is conceivable that the Section was once widespread over the area enclosed in the triangle that they now make and that these three are the remnants of a dying group, having been replaced by evolving forms of cylindric and clavate offspring.

The plants may be thought of as clavate opuntias which extend their growth from the apex of each joint for one to a few growing seasons.

Through the courtesy of Professor Ira Wiggins, curator of the Dudley Herbarium of Stanford University, the historical data of *Opuntia bradtiana* are here given:

Coulter, in 1896, described it as *Cereus bradtianus*, as follows:

Cereus bradtianus Coulter, Contr. U. S. Nat. Herb. 3: 406. 1896.

"65. *Cereus bradtianus*, sp. nov.

Cylindrical, becoming 12 dm. high, the branches about 12 cm. long and 4 cm. in diameter: ribs 9, obtuse, slightly if at all tuberculate, with circular areolae 10 to 15 mm. apart and bearing more or less persistent grayish tomentum: spines numerous, white and translucent, rigid and spreading in every direction; radials 15 to 18, slender, somewhat unequal, more or less radiant, 10 to 12 mm. long; centrals 5 to 7, stouter, often subangular, quite unequal (usually 1 or 2 especially prominent), 15 to 30 mm. long: flowers yellow: fruit spiny.—Type in Herb. Coulter.

Plains of Coahuila.

Specimens examined: Coahuila (*Anna B. Nickels* lf 1895).

The bright white spines on the vivid green body give the plant a striking appearance. Mrs. Nickels writes that the plant "sometimes covers a half-acre of ground, and seems to propagate by falling over on the ground and rooting all along the stem from which new plants sprout." Mrs. Nickels requests that the species be named for Mr. Geo. M. Bradt, editor of "The Southern Florist and Gardener," of Louisville, Kentucky.

The following comments are by Mrs. Katherine Brandegee in *Erythea* 5: 121. 1897. Comment was made in a footnote following her description of *Opuntia invicta*.

"*Opuntia bradtiana* (Coul.) K. Brandegee.

"*Opuntia bradtiana* (Coul.), *Cereus bradtianus* Coulter, Contr. U. S. Nat. Herb. 3: 406. 1896, is perhaps the nearest relative of *Opuntia invicta*. In both species the tubercles are more or less confluent into vertical ridges. In *Opuntia bradtiana* they are almost completely so. The spines are, however, barbed and the young joints are covered with conspicuous subulate leaves, so that there can be no doubt that it belongs to *Opuntia*, although I have not seen the fruit or flower."

Grusonia bradtiana (Coulter) Br. & Rose Cactaceae I. 215. 1919

(The following is copied from Britton & Rose loc. cit.)

7. *GRUSONIA* F. Reichenbach in Schumann, Monatsschr. Kakteenk, 6: 177. 1896.

A low, much branched cactus, the branches terete, jointed, and ribbed; areoles borne on the tops of the ribs, very spiny, but all except the flowering ones without glochids, subtended by small deciduous leaves; corolla rotate, yellow; fruit baccate.

This was first described as a *Cereus* from specimens collected by Mrs. Anna B. Nickels in 1895, then as a new genus *Grusonia*, and lastly as an *Opuntia*. It clearly is not *Cereus*, but

Grusonia Section of Opuntia

Spines reddish, sometimes with sheaths.....	<i>O. santa-maria</i>
Spines white or yellow, sheathless.....	
Spines white or clear—joints cylindric.....	<i>O. bradtiana</i>
Spines yellowish-red—joints more clavate.....	<i>O. wrighbiana</i>

when growing might easily be mistaken by its habit for *Echinocereus*. The leaves, glochids, flowers, and fruit are those of *Opuntia*, but its ribbed stem is unlike that of any known species of that genus.

1. *Grusonia bradtiana* (Coulter).

Cereus bradtianus Coulter, Contr. U. S. Nat. Herb. 3: 406. 1896 (April).

Grusonia cereiformis F. Reichenbach in Schumann, Monatsschr. Kakteenk. 6: 177. 1896 (December).

Opuntia bradtiana K. Brandegee, Erythea 5: 121. 1897.

Opuntia cereiformis Weber, Dict. Hort. Bois 897. 1898.

Forming dense, often impenetrable thickets 2 meters high or less, very spiny; stems light green, 4 to 7 cm. thick, with 8 to 10 low, longitudinal, somewhat tuberculate ribs; areoles 1 to 1.5 cm. apart, 3 to 5 mm. in diameter; leaves linear, fleshy, green, 8 mm. long, early deciduous; spines 15 to 25, yellowish brown when young, soon becoming white, acicular, terete or slightly compressed, 1 to 3 cm. long, not sheathed, some of the longer ones reflexed; wool white, turning brown, early disappearing; corolla rotate, opening in bright sunlight, 3 to 4 cm. broad; sepals ovate, acute, fleshy; petals bright yellow, spatulate, fringed; filaments brownish yellow; stigma-lobes 8, yellow; areoles of the ovary with long, yellow, weak spines, white wool, and yellow glochids; berry (according to Schumann) ellipsoid, deeply umbilicate; seeds not seen.

Type locality: Plains of Coahuila, Mexico.

Distribution: Coahuila, Mexico.

This species first appeared in print in the catalogue of Johannes Nicolai under the name of *Grusonia cereiformis*, but we are informed that there was no description and therefore it was not technically published. The same name next appears in the Monatsschrift für Kakteenkunde for 1894. Here Dr. Schumann wrote a long article about the name, especially condemning the loose manner in vogue of publishing new names without descriptions, but giving no characters of the plant, and as a matter of fact he did not then know it. Two months later this name again appears in this same publication, but without description. Two years later Dr. Schumann records seeing this plant and describes it briefly, although he does not approve of the name *Grusonia*. If the name is to be considered published, it should not date earlier than this (December 1896), although Dalla Torre and Harms accept the date of 1894. In 1898 Weber transferred the name to *Opuntia*, publishing it as *Opuntia cereiformis*; in the

meantime Coulter (in 1896) published the name *Cereus bradtianus* for the plant and Mrs. Brandegee (in 1897) transferred it to *Opuntia*, calling it *Opuntia bradtiana*.

Illustrations: Monatsschr. Kakteenk. 21: 121, as *Opuntia bradtiana*; Schumann, Gesamtb. Kakteen f. 101, as *Opuntia cereiformis*.

Plate XXXIII, figure 4, represents a joint of the plant collected by C. A. Purpus at Cerro de Cypriano, near Morano, Mexico, in 1910.

The JOURNAL shows *Opuntia bradtiana* on page 454 of Volume II, No. 10, April, 1931.

The proposed *Opuntia santa-maria* is illustrated on page 5 of Volume III, No. 1, July, 1931 as "Opuntia Gates No. 131." The account of its discovery is also given there.

NOTES

By G. A. FRICK

Echinocactus ingens has 40 to 50 ribs and the aggregate number of spines have been computed at 50,000 on one mature plant.

The juice of the *Opuntia* fruit is considered an infallible cure for fever and stomach troubles by the Mexican peon, writes Dr. Francisco Garcia, of Monterey, Mexico.

The word Cactus was applied by the ancient Greeks to any prickly plant, and was later adopted by Linnaeus as the name of the group of plants we so much admire and are now known by the family name Cactaceae.

Would you believe it when told that the nearest relatives of the Cactaceae are the violets, the passion flowers and the begonias. Mr. Shreve, in his book, "The Cactus and Its Home," tells us that is the case, but this merely means the possibility that the four families have descended from a very ancient common ancestry.

Lists Received by the Librarian

T. R. Schroeder, 4821 Strong St., Chicago, Ill. (free).

Tuxedo Cactus Gardens, 633 N. Central Ave., Stockton, Calif. (free).

Eugene R. Ziegler, Spencerport, N. Y. (free).

G. Ghose & Co., Town End, Darjeeling, India. (free—only a few succulents listed.)



Photo by John D. Wright

An interesting photograph of *Sempervivum arachnoides* flowering in the garden of Mrs. John Wright of Santa Barbara.

The Eastern Local Distribution of *Lemaireocereus bystrix*

By N. L. BRITTON

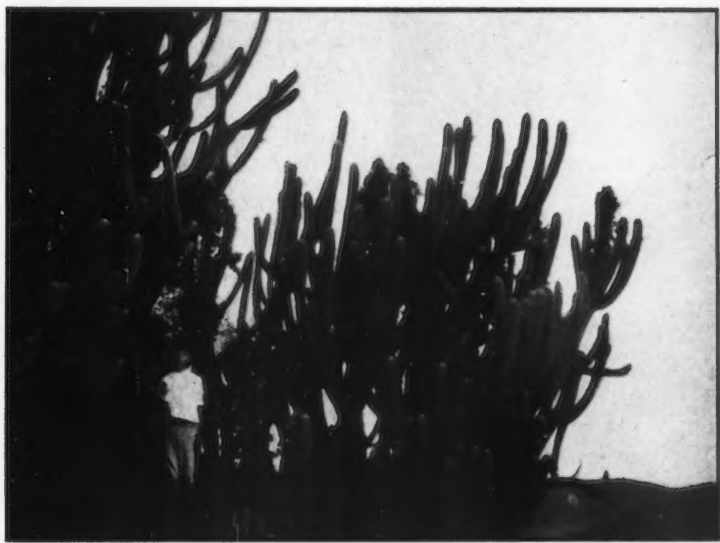


Photo by Geo. F. Anton

Lemaireocereus bystrix Porto Rico

In the Descriptive Flora of Porto Rico and the Virgin Islands*, this large, tall species was recorded from the two small Porto Rican islands Desecheo, in the Mona Passage, and Cayo Muertos off the southern coast near Ponce; both stations were observed by me in 1914 and 1915. They were also recorded in "The Cactaceae" 2: 86, 1920. Its occurrence on the mainland of Porto Rico was first ascertained by Mrs. Charles E. Horne and Professor Horne in August, 1931, and by Professor H. C. Cowles, about the same time, near a lagoon, east of La Parguera, on the southern coast; a fine water-color painting was made by Mrs. Horne from specimens obtained there.

Subsequently, Professor George F. Anton detected a large and striking colony on a hillside west of Ensenada and a small one at Salinas de Guanica, both stations also near the southern coast of Porto Rico.

During his noteworthy studies of Herpetology, Major Chapman Grant has recently inten-

sively explored all parts of Porto Rico, and its small islands, incidentally has critically observed the Cacti, visiting also the Virgin Islands; he has informed me that *Lemaireocereus bystrix* grows also on Mona Island, in the Mona Passage, and has kindly given me a flower collected from a plant on Dog Island, between St. Thomas and St. John, in the Virgin Islands; he also reports observing the plant on Peter Island, on Buck Island, and at Fallen Jerusalem, in the same archipelago, which represents the most eastern station known.

J. N. Manson of Nogales, Arizona, writes: "I have seen cattle and deer standing in a cholla bed munching the spiniest of *Opuntia* stems as though they were the sweetest of alfalfa hay. After an hour or so of feeding in these Cactus patches the animal assumes the appearance of the plant itself, becoming coated with stems that brush off the stalks. Beef tongues purchased in the markets are always searched for spines.

*Britton and Wilson, Sci. Survey of Porto Rico and Virgin Islands 5: 614. 1924.

Contributions Toward a Monograph of the Genus *Dudleya*--III

By DONALD A. JOHANSEN



Photo by H. E. Gates

Dudleya gatesii sp. nov., as growing in its native habitat.

Dudleya gatesii sp. nov.

Diagnosis: Solitari aut cum 2 vel 3 rosettis in caudice brevi, crasso; foliis basis longo-lanceolatis, acuminatis, 8-13 cm. longis, 4 cm. basi latis; crassis sed planis, viridibus subnigris, ab tempestate subrubris; caulibus florentibus 3 aut pluribus, 5-7.5 dm. altis, subtus nudis; foliis caulinis acriter deflectis cum apicibus libratis; inflorescentia paniculato-cymosa, ab circiter 4 racemis semel- aut bis-dichotomosis, bis 22 cm. latis consistente; corolla 11-12 mm. longa, ad medium fissa, alba pura; antheris rubris subnigris. Ab H. E. Gates in Via Barrili ad orientem vergente ab Calmalli circiter 24.1 km., California Inferiore primo collecta. Species rarissima et loci, solum in uno colle saxoso inventa.

Plants with a short, stout caudex, generally solitary or if caespitose with never more than three rosettes. Basal leaves fairly numerous, linear-lanceolate to long-lanceolate, acuminate, 8-13 cm. long, about 4 cm. wide at base, thick-

ish but flat, tips of older leaves becoming erect, dark green, the older ones weathering reddish. Flowering stems arising from between younger and older leaves, usually three or more, 5-7.5 dm. long, stiffly erect, naked below, reddish. Cauline leaves numerous, lanceolate-attenuate, acuminate, 2.0-2.5 cm. long, somewhat cordate-clasping at base, deflected sharply from base but with the tips becoming horizontal, reddish-green. Inflorescence cymose-paniculate, consisting of about four once- or twice-dichotomous secund racemes, about 22 cm. across. Pedicels slender, 1-1.3 cm. long. Calyx cleft nearly to the base, the segments lance-attenuate or merely long-lanceolate, acuminate, about 6 mm. long, bright green, slightly glaucous. Corolla 11-12 mm. long, cleft to the center, the segments lanceolate, short-acuminate, weakly keeled, pure white. Filaments subequal; anthers linear-oblong, 2.2 mm. long, dark red before dehiscence. Carpels attached only at the very base, remaining close together above for their entire length.

The description has been based upon living plants collected by Mr. Howard E. Gates (his No. 325) in 1931 about 15 miles east of Calmalli on the Barril Road, Baja California (113° 10' W, 28° 15' N). The plants were found only on a single dry, rocky, granitic hill, and were sparsely scattered. It is apparently a very rare and local species, and its pretty white flowers give it a mark of unexpected distinction. Mr. Gates' own specimens have grown well with him, but our own ones have not done so well, having been ruthlessly handled by government inspectors while en route to us. Consequently, we have based the description partly upon Mr. Gates' specimens. The photograph of the plant which we have designated as the type was made by Mr. Gates in its native habitat; the character of the rosette and the sharply deflected cauline leaves are well shown, but the inflorescence is very immature.

The species is being named for Mr. Gates in recognition of his several years' exploratory and collection efforts in Baja California, which have resulted in the bringing to light of many new species of *Dudleya* as well as of other genera in various families.

Dudleya regalis sp. nov.

Diagnosis: Planta caespitosa, rosettis saepe numero 200; foliis linearibus vel lineo-lanceolatis, brevi-acuminatis, 7-10.5 cm. longis, 1.5-1.9 cm. latis, planis, viridibus nitentibus; caule florente circa 25 cm. alto; foliis caulinis libratitis; inflorescentia paniculata-cymosa, conferta, 5-7 cm. latis; calycis lobis 6.5 mm. longis; corolla 13-14 mm. ad partem ab basi 1 mm. fissa, subalba cum suffusione viridi; antheris flavis. Ab Ralph Hoffmann in Insula Principis, California collecta. Haec est probabiliter maxima specierum multicapitalium.

Caulescent; caespitose, the heads on some plants numbering up to 200. Leaves very numerous, linear to linear-lanceolate, short-acuminate or merely mucronate, much broadened at the very base, 7-10.5 cm. long, 1.5-1.9 cm. wide, flat, solid, indistinctly keeled on both sides, bright green, shining. Flowering stem arising from among withered leaves, about 25 cm. high, reddish-straw below, glaucous above; the cauline leaves horizontal, lanceolate, cordate-clasping at the base, thick, acute or some becoming caudate-acuminate, averaging 2 cm. long, dark green, shining. Inflorescence somewhat paniculate, short, compact and flat-topped, 5-7 cm. across, slightly glaucous. Pedicels arising at an acute angle, stout, 5-7 mm. long. Calyx cleft to the base, the segments lanceolate, equal, 6-5 mm. long, greenish-glaucous, acute. Corolla deeply cleft, the tube about 1 mm. long; the lobes 12-13 mm. long, 4.8 mm. wide, linear-attenuate, flat, thick, keeled on the back, widely spreading, pale white with a light greenish suffusion appearing through from the greenish keel. Filaments subequal; anthers oblong, 0.9-1.0 mm. long, yellow. Carpels attached together only at the very base, remaining close together above.

The description has been based upon a living clump collected by the late Ralph Hoffmann on Prince Island, off San Miguel Island, California, May 10, 1932. The type specimen has been deposited in the Dudley Herbarium of Stanford University.

The specific name is in reference both to the regal appearance of the plants and to their occurrence on Prince Island. On the whole, *D. regalis* bears no close resemblance to any other species known to me, its white flowers being its most prominent character, with the size and number of the rosettes coming next. The photographs which were taken unfortunately turned out too poorly to be reproduced.

NOTES

By G. A. FRICK

Evidently Hollywood has not yet been informed that South Africa has no native Cactus. In a picture now being shown throughout the country of African scenes, a tree of *Euphorbia ingens* is shown and described as a cactus. The only cactus native to Africa is *Rhipsalis*.

Mesembrianthemum aequilaterale, the prostrate plant with the thick three-sided leaves and edible fruit which is cultivated as a sand-dune binder along the coast of California, is native to South Africa but has now become naturalized and does better here than in its native habitat.

The annual Mexican Agricultural Show, sponsored by the Department of Agriculture of Mexico, was held at San Jacinto, near Mexico City, November 13 to 20. One of our members, Ferdinand Schmoll, of Cadereyta, Qro., entered an exhibit of Cactus displayed in a rock garden.

Another branch of the Cactus Society has been formed at San Fernando, Calif., by members living in that vicinity. D. C. Farnsworth was elected president. The first meeting of the new club was held in the home of Willis A. Rowe. Among the speakers of the evening was Dr. A. D. Houghton. Mrs. Margaret Stanley was elected secretary, and F. W. Benedict, treasurer.

An article of extraordinary interest to our membership appears in the Nature Magazine, November issue, under the title, "Cactus Pearls". The author, Isabel Hemenway, therein describes most vividly the way in which the fantastic shapes are formed by these interesting growths in the cactus. Although this subject has been covered twice in the CACTUS JOURNAL (Vol. I, No. 8, and Vol. II, No. 10) Miss Hemenway presents it in a way that furnishes a new angle to the collection of these desert gems.

The first Cactus Show ever held in San Antonio, Texas, will be given at the Witt Memorial Museum some time in January. The exact date has not yet been decided upon but will be published in the JOURNAL next month. All Texas members of the Cactus Society are urged to co-operate in making this a success and an annual event. The show is being sponsored by the San Antonio Garden Club. Mrs. R. R. Witt, president, is also president of the show committee.

HEARING CALLED TO CONSIDER RESTRICTIONS ON PACKING MATERIALS

A public hearing which was called by the Secretary of Agriculture was held in Washington, D. C., October 26, 1932, to consider possible quarantine measures affecting the movement into or within the United States of certain packing materials of plant origin capable of carrying dangerous plant diseases and insect pests.

Various plants and plant products used as packing materials in connection with ordinary commercial shipments from abroad are known to constitute a distinct danger to the agricultural interests of this country on account of the plant diseases and insects which they may carry with them. An outstanding example, says the Bureau of Plant Quarantine, is rice straw, used frequently for packing foreign pottery, and which has been repeatedly found at entry to be infested with the rice stem borer, *Chilo simplex*. There are also some 80 to 90 plant diseases of rice

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known abroad which are as yet absent from the continental United States. For many of these packing straw provides a dangerous means of introduction.

This hearing is called with the rice straw situation especially in mind, but the department is also taking advantage of the occasion to review various other packing materials, the safety of which may be likewise questioned, so that the whole subject may be given complete consideration at one time. The bureau hopes that the information presented at this hearing will enable the department to determine which, if any, of the materials listed should be excluded or restricted.

The list of materials under consideration includes several which are already the subject of special quarantine measures (corn, cotton, sugarcane, bamboo). These are included for the sake of completeness, and as well to determine whether or not they should be covered by any special packing material restrictions.

It is noted also that consideration of the subject of packing materials in general is needed to bring the regulation of materials used in packing imported merchandise into better accordance with the restrictions which have long been in effect for packing materials used with imported plants under Quarantine 37, the Nursery Stock, Plant, and Seed Quarantine.

Because of the provisions of the Plant Quarantine Act it is necessary that this problem of packing materials be considered separately for foreign countries and for the Territories of Hawaii and Puerto Rico; hence notices of hearing covering both phases of the subject have been issued, though the hearings will be held concurrently.

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